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(54) Disposable filter for dental handpiece.

(57) A filter is provided for a dental device of the type including a hand-held working portion which utilizes air and water and a utility supply portion which supplies air and water to the hand-held working portion through respective air and water conduits therein. The filter comprises a filter body defining an air opening therethrough and a water opening therethrough. The air and water openings are respectively positioned for alignment with corresponding air and water openings of at least one of a hand-held working portion and a utility supply portion. The filter body has a filter medium for filtering air and water passing through the respective air and water openings thereof.

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Background of the Invention

The present invention is directed generally to improvements in dental devices and more particularly to a novel and improved filter for filtering respective air and water utility supplies to a hand-held dental device.

Many dental devices used by dentists utilize respective air and water supplies. Examples of such devices include handpieces (i.e., high speed dental drills), low speed air motors, syringes and scalers. Typically, such devices include a hand-held working portion with which some procedure is performed on the patient, and a utility supply portion, generally in the form of an elongate hose or tube through which air and water supplies to the hand-held portion are provided. The present application refers specifically to a high speed dental drill handpiece (hereinafter "handpiece") of the type which includes an air driven turbine for rotating a bur (i.e., the drill bit) for drilling the teeth of the patient.

Heretofore, the air and water supplied to the hand-held portion or handpiece of such dental devices has not been filtered. However, more recently there has been some concern regarding the presence of airborne and/or waterborne contaminants in this environment.

In a typical device from two (i.e., one air line and one water line) to four supply lines are provided in both the utility supply and in the hand-held portion. In a handpiece (high speed drill) these lines include a drive air line and an air exhaust line for driving a turbine portion of the handpiece. A water line is provided in such handpieces in order to cool the bur and the tooth of the patient so as to avoid overheating of the tooth. In this regard, typical rotational speeds of the burs of such handpieces are on the order of 400,000 rpm. It is generally preferred that the water supply be in a mist form, and to this end a secondary air line, often referred to as "chip air" is also often provided to mist the water from the water supply line as it leaves the handpiece. This chip air is provided in one of two forms. In some handpieces, the chip air is bled off from the drive air supply conduit while in other handpieces, a separate utility line is provided for chip air.

Many handpieces also include an optical opening through which a glass tube or fiber optic element is inserted to provide light near the working end of the handpiece. In some cases such light is provided in the form of small electric lamp in the handpiece itself, in which case electrical connectors and conductors are provided in the handpiece and through the utility supply hose or tube. In other cases the lamp is provided near the end of the utility supply tube which carries appropriate electrical conductors and or connectors for the lamp, and the illumination from the lamp is fed through a fiber optic light conductor or other suitable conduit which extends through the handpiece portion of the device. In either event, provision for some sort of lighting requires the provision of an additional through opening or conduit in both the hand-held portion and the utility supply portion of the dental device, and alignment thereof.

Typically, such dental handpieces and their utility supply hoses or tubes are of relatively small diameter to facilitate easy grasping and maneuvering by the dentist. Accordingly, the space available within which to run the various supply lines or conduits, as well as the cross-sectional area available for providing filtering for these lines is limited. More particularly, it will be recognized that the cross-sectional areas or diameters of the respective air and water utility supplies and their corresponding openings or conduits in both handpiece and utility supply hose are smaller yet.

As an additional matter, it is currently recommended that a sterilized handpiece be used for each patient, thereby requiring that the handpiece be removed from the utility supply hose and replaced with a sterilized handpiece for each new patient. Under such circumstances, in order to maintain the sterile handpieces in a sterile condition, including the internal conduits for air and water, as well as to prevent cross-contamination of the utility supply hose or tube, we propose providing a filter intermediate the hand-held portion and the utility supply portion of the dental device. We have further proposed filtering all of the supply lines which run from the utility supply to the hand-held portion of the device, that is, not only the drive air but also the exhaust air, as well as the water and the chip air, in installations were a separate chip air line is provided in the utility supply.

Heretofore, handpieces have been connected to utility supply hoses in one of two manners. One type of connection is a threaded one in which a threaded coupling sleeve is used intermediate the handpiece and the supply hose. Either the handpiece has a plurality of tubes projecting longitudinally from its end part for insertion into corresponding mating openings in the supply hose, or vice-versa, to interconnect the respective lines for air and water, as described hereinabove. The handpiece and supply hose can also be coupled with a quick connect/disconnect type of coupling Such as bayonet coupling of the type shown in prior U.S. Patent No. 5,039,304, which is commonly owned herewith.

Therefore, the addition of a filter for the various air and water utilities to the handpiece must take into account the particular mating conduit end structures of the hand-held portion and supply

hose, and also the mating coupling or connecting structures utilized in present dental devices. This is necessary in order to provide for retrofitting of a suitable filter to existing dental devices. Such considerations also apply at least in part to our proposed modified handpiece in which an additional end cavity portion is specifically provided for mounting such a filter element, such that the filter element will be interposed intermediate the air and water supply lines of handpiece and of the utility supply hose in operation.

Objects and Summary of the Invention

Accordingly, it is a general object of this invention to provide a novel and improved filter for a dental device.

Briefly, and in accordance wig the foregoing, a filter is provided for a dental device of the type including a hand-held working portion which utilizes air and water and a utility supply portion which supplies air and water to said hand-held working portion through respective air and water conduits therein. The filter comprises a filter cartridge body defining an air opening running therethrough and a water opening running therethrough, said air and water openings being respectively positioned for alignment with corresponding air and water openings of one of a hand-held working portion and a utility supply portion; said filter cartridge having filtering means for respectively filtering air and water passing through the respective air and water openings thereof.

Brief Description of the Drawings

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The organization and manner of operation of the invention, together with further objects and advantages thereof may best be understood by reference to the following description, taken in connection with the accompanying drawings in whim like reference numerals identify like elements, and in which:

Fig. 1 is a perspective view of a dental device including a handpiece and utility supply hose, and provided with a filter in accordance with the invention;

Fig. 2 is an enlarged partial exploded perspective view of the device of Fig. 1;

Fig. 3 is a partial sectional view through a filter cartridge and adapter in accordance with one form of the invention;

Fig. 4 is a partial sectional view similar to Fig. 3 illustrating a bayonet type connection;

Fig. 5 is an end view of a filter cartridge in accordance with one form of the invention;

Fig. 6 is a sectional view taken generally along the line 6-6 of Fig. 5;

Fig. 7 is a sectional view taken generally along the line 7-7 of Fig. 5;

Fig. 8 is a sectional view taken generally along the line 8-8 of Fig. 5;

Fig. 9 is an enlarged partial sectional view similar to Fig. 7 showing an alternate form of a filter element in accordance with the invention; and

Fig. 10 is an enlarged partial side elevation, partially in section, illustrating an assembled dental device similar to that of Fig. 1, including a modified filter in accordance with the invention.

Detailed Description of the Illustrated Embodiment

Referring now to the drawings, and initially to Figs. 1 and 2, there is illustrated a dental device 20 of the type which includes a hand-held working portion 22 and a utility supply hose or tube portion 24 operatively coupled to the hand-held portion 22. In the illustrated embodiment the hand-held portion 22 comprises a high speed dental drill handpiece (hereinafter referred to as "handpiece"). The handpiece 22 receives both air and water supplies from the utility supply or hose 24. A hand-held working portion of a different sort, for example a low speed air motor, a syringe, or a scaler implement might be utilized with a similar utility supply 24 without departing from the invention.

The utility supply, as best seen in Fig. 2 includes elongated through tubes or conduits for supplying air and water respectively to the handpiece 22. In the illustrated embodiment, these air and water conduits include a drive air supply conduit 26 and an exhaust air conduit 28 for supplying air to and exhausting air from a turbine (not shown) which drives a bur 30 of the handpiece, this turbine being located in the head portion 32 of the handpiece 22. Water is provided for cooling the bur 30 and the tooth of the patient through a water supply conduit 34 and so-called chip air is provided through an air conduit 36. This chip air is used to mist or atomize the water, which has been supplied through the water conduit 34, at the head 32. In the handpiece 22 of Fig. 1 the water outlet is indicated generally at reference numeral 38 where it exits adjacent the head 32.

Similar conduits are provided within the handpiece 22 for matingly engaging the open ends of the conduits just described in the utility supply hose 24. These conduits generally project outwardly from the head so as to enter into the corresponding end openings of the hose conduits. These handpiece conduits include a drive air supply conduit 38, an exhaust air conduit 40, a water conduit 42 and a chip air conduit 44.

An additional optical opening or conduit is provided through which a fiber optic or other light source may be provided to illuminate the work area adjacent the head 32. This light conduit is indicated by reference numeral 46 in the hose 24 and by reference numeral 48 in the handpiece 22. The illumination is provided generally at a window or opening 50 adjacent the head 32 as shown in Fig. 1. A suitable sealing gasket 52 may be provided intermediate the handpiece 22 and the utility supply hose 24.

The above-described structure is generally similar to that illustrated and described in U.S. Patent No. 5,039,305 which is commonly owned herewith, and in which the handpiece 22 directly couples to the utility supple hose 24 by means of a suitable adapter.

Departing from what is shown in this prior patent, the present invention advantageously interposes a filter cartridge 60 intermediate the handpiece 22 and the utility supply hose 24. In the embodiment illustrated herein the filter cartridge 60 is arranged to be held in an adapter 62, similar to the adapter shown in the above-reference patent, but lengthened somewhat in order to accommodate the filter cartridge 60. However, the filter cartridge 60 could be accommodated within a modified handpiece 22 or within a modified utility supply portion 24, without departing from the invention.

The filter cartridge 60 includes cartridge body 64 which includes a plurality of through conduits generally aligned with the respective air and water conduits of the handpiece 22 on the one side and of the utility supply hose 24 on the other side, these latter conduits having been described hereinabove. The filter cartridge 60 in the illustrated embodiment has air and water conduits which at one end are generally identical in form to the open ends of the conduits of the supply hose 24 and at the other end are generally identical in form to the projecting conduits of the handpiece 22, such that the filter cartridge 60 directly interfits between the handpiece 22 and supply hose 24. To this end, an additional gasket 74 substantially identical to gasket 52 is interposed between the supply hose and the filter cartridge 60, while the first gasket 52 is interposed between the filter cartridge 60 and the handpiece 22.

Referring also to Figs. 3-8, the conduits of the filter cartridge 60 are identified as follows: drive air supply 76, exhaust air 78, water 80, chip air 82 and optical or light 84. An O-ring 86 is provided in the illustrated embodiment for sealing the exterior surface of the cartridge 60 with respect to a facing interior surface of the adapter 62, or of the handpiece 22, when a modified handpiece for accommodating the filter cartridge is provided, as mentioned above.

As shown in Figs. 3 and 4, the adapter 62 is provided with suitable connectors at its ends for connection to the handpiece 22 on one side and to the supply hose 24 on the other side. The connector for connection to the handpiece 22 comprises an internally threaded surface 88 configured for mating engagement with an external thread 90 of the handpiece 22. In the embodiment illustrated in Figs. 2 and 4, the connector for engagement with the supply hose 24 comprises quick connect or bayonet type connector 92. In this regard, the bayonet or quick connect type connector 92 and suitable mating pins (not shown) for engaging the same in the utility supply hose 24 are preferably as illustrated and described in the above-referenced U.S. Patent No. 5,039,304. In the embodiment illustrated in Fig. 3, the adapter 62 includes a second externally threaded connector 94 for connection to a complementary thread (not shown) of a utility supply which is otherwise the same as the utility supply hose 24 illustrated in Fig. 2. In the illustrated embodiment, the cartridge body 60 also includes a somewhat enlarged diameter end portion 96 for engagement with a corresponding mating shoulder or step portion 98 formed within the adapter 62 for engaging and positioning the filter cartridge therewithin.

Referring now to Figs. 5-10, the cartridge body 64 includes an annular circumferential groove 98 for accommodating the O-ring 86. As best viewed in Fig. 8, the light or optical conduit 48 comprises an elongate through opening through the cartridge body 64. An additional optical transmitting element such as a prism or fiber optic element 100 may be inserted in the opening 48 to enhance the transmission therethrough and through the filter cartridge, so as to minimize the light loss through the filter cartridge.

In the embodiment shown in Figs. 5-9, the filter cartridge is composed of first, second and third body portions, 102, 104 and 106, each of which comprises a generally cylindrical body. These body portions 102, 104, 106 are coaxially aligned and of the same outer diameter in the preferred embodiment illustrated. The body portions 102, 104, 106 are spaced apart by narrow gaps, in which are fitted respective first and second filter elements 108, 110. The filter material selected for forming filter elements 108 and 110 will be of a selected porosity for excluding particles above a certain size. Various filter pore sizes might be selected in this regard, depending upon the type of viral, bacterial or other contaminants to be filtered.

Referring briefly to Fig. 9, should an additional effective surface area of the filter be desired, an elongate tubular closed-ended portion of one or both filter elements might be formed extending into the conduit with which it is associated. One such

5. A filter according to claim 1 wherein said cartridge is configured for interfitting within a cavity provided therefor in a hand-held working portion of a dental device at an end thereof which is connectible to a utility supply portion.

6. A filter according to claim 1 wherein said cartridge body further includes an elongate through opening for transmitting light from a utility supply portion to a hand-held working portion of a dental device.

7. A filter according to claim 6 and further including an optical transmitting element extending longitudinally through said elongate through opening of said cartridge body for transmitting light from a utility supply portion to a hand-held working portion of a dental device through said filter cartridge.

8. A filter according to claim 6 and further including a through opening in said filter element for transmitting light therethrough.

9. A filter according to claim 1 wherein said filter element comprises a relatively thin disc-shaped element extending transversely across said filter cartridge body.

10. A filter according to claim 9 wherein said filter element includes a generally tubular, closed-ended portion extending into at least one of said air and water openings in said filter cartridge body for increasing the effective surface area of said filter element.

11. A filter according to claim 9 and further including a second filter element comprising a relatively thin disc-shaped element extending transversely across said cartridge body and axially spaced from the first filter element.

12. A filter according to claim 9 wherein said cartridge body comprises first and second coaxially aligned body portions closely axially spaced for mounting said filter element therebetween.

13. A filter according to claim 1 wherein said cartridge body is smaller in cross-sectional dimensions than mating end parts of a hand-held portion and a utility supply portion of a dental device, to thereby permit a relatively smooth merger of external surfaces thereof with said filter cartridge operatively interposed therebetween.

14. A filter according to claim 1 wherein said cartridge body comprises a plurality of coaxially aligned, stacked body portions and wherein a plurality of filter elements are provided each intermediate respective ones of said cartridge body portions.

15. A dental device comprising: a hand-held working portion which utilizes air and water and a utility supply portion which supplies air and water to said hand-held working portion through respective air and water conduits therein; a filter cartridge including a cartridge body having a longitudinal axis and defining an air opening running longitudinally through said cartridge body and a water opening running longitudinally through said cartridge body, said air and water openings being respectively positioned for alignment with ends of corresponding air and water openings of air and water conduits in facing ends of said hand-held working portion and said utility supply portion, respectively; and at least one filter element mounted within said filter cartridge and interposed across the respective air and water openings thereof for respectively filtering air and water passing therethrough between said hand-held working portion and said utility supply portion; said filter cartridge being configured for mounting intermediate air and water connections of said hand-held working portion and said utility supply portion.

16. A dental device according to claim 15 and further including adapter means having an adapter body configured for mounting said filter cartridge therewithin and connector means for mounting said elongate body intermediate said hand-held working portion and said utility supply portion of a dental device.

17. A dental device according to claim 15 wherein said cartridge is configured for interfitting within a cavity provided therefor in said hand-held working portion at an end thereof which is connectible to said utility supply portion.

18. A dental device according to claim 15 wherein said cartridge body further includes an elongate through opening for transmitting light from said utility supply portion to said hand-held working portion.

19. A dental device according to claim 15 and further including an optical transmitting element extending longitudinally through said elongate through opening of said cartridge body for transmitting light from said utility sup-

extended tubular closed-ended portion of the filter element 108 is indicated at reference numeral 112 in Fig. 9,and extends into the conduit 42.

Fewer or more such filter elements and a corresponding number of body portions might be provided as desired without departing from the invention For example, it is possible that one of the filter elements 108, 110 may serve to filter the water line while the other might serve to filter the three air lines or conduits. On the other hand, both of the filter elements 108 and 110 may extend across and filter all of the air and water lines or conduits, if desired in a particular application. In any event, all of the filter elements are provided with through openings through which the optical channel 84 and/or an optical element 100 contained therein may pass unimpeded as illustrated in Fig. 8.

In the embodiment shown in Fig. 10, a single filter, element 110 is positioned between two cartridge body portions 102a, 106a. It should be noted that the partial section shown in Fig. 10 is developmental in form, indicating a development or section which bisects the drive air supply conduit 76 and the water conduit 80. A portion of the optical conduit 48 of the handpiece 22 is also shown in Fig. 10, entering the filter cartridge 60.

In the illustrated embodiments, the body portions 102, 104 and 106 or 102a, 106a are generally coaxially aligned and have their outer circumferences or peripheries aligned. Similarly, the filter elements 108 and 110 preferably comprise relatively thin disk-shaped circular elements which are coaxially aligned with the filter cartridge body 64 and which have outer diameters sized the same as the outer diameter of the filter body 64 and its body portions 102, 104 and 106, or 102a and 106a. Thus, an external surface of the filter body is substantially continuous and cylindrical in form with the exception of the projecting holding portion 96 and the O-ring receiving groove 98. Also, the filter cartridge has smaller external cross-sectional dimensions than those of the handpiece 22 and utility hose 24. Accordingly, as shown in Fig. 1, the dental device incorporating the filter cartridge 60 operatively interposed between handpiece 22 and utility hose 24 is permitted a smooth merger of its external surfaces.

While particular embodiments of the invention have been shown and described in detail, it will be obvious to those skilled in the art that changes and modifications of the present invention, in its various aspects, may be made without departing from the invention in its broader aspects, some of which changes and modifications being matters of routine engineering or design, and others being apparent only after study. As such, the scope of the invention should not be limited by the particular embodiment and specific construction described herein but should be defined by the appended claims and equivalents thereof. Accordingly, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of the invention.

Claims

1. A filter for a dental device of the type including a hand-held working portion whim utilizes air and water and a utility supply portion which supplies air and water to said hand-held working portion through respective air and water conduits therein; said filter comprising: a filter cartridge including a cartridge body having a longitudinal axis and defining an air opening running longitudinally through said cartridge body and a water opening running longitudinally through said cartridge body, said air and water openings being respectively positioned for alignment with ends of corresponding air and water openings of air and water conduits in facing ends of a hand-held working portion and a utility supply portion, respectively; and at least one filter element mounted within said filter cartridge and interposed across the respective air and water openings thereof for respectively filtering air and water passing therethrough between a hand-held working portion and a utility supply portion of a dental device; said filter cartridge being configured for mounting intermediate air and water connections of a hand-held working portion and a utility supply portion of a dental device.

2. A filter according to claim 1 and further including adapter means having an adapter body configured for mounting said filter cartridge therewithin and connector means for mounting said elongate body intermediate a hand-held working portion and a utility supply portion of a dental device.

3. A filter according to claim 2 wherein said connector means include first connector means located and configured for cooperatively interfitting with a mating connector on a hand-held working portion of a dental device and second connector means located and configured for cooperatively interfitting with a mating connector on a utility supply portion of a dental device.

4. A filter according to claim 3 wherein said first and second connector means comprise threaded surfaces formed at opposite ends of the body of said adapter means.

ply portion to said hand-held working portion through said filter cartridge.

20. A dental device according to claim 18 and further including a through opening in said filter element aligned with said through opening in said cartridge body.

21. A dental device according to claim 15 wherein said filter element comprises a relatively thin disc-shaped element extending transversely across said filter cartridge body.

22. A dental device according to claim 15 wherein said filter element includes a generally tubular, closed-ended portion extending into at least one of said air and water openings in said filter cartridge body for increasing the effective surface area of said filter element.

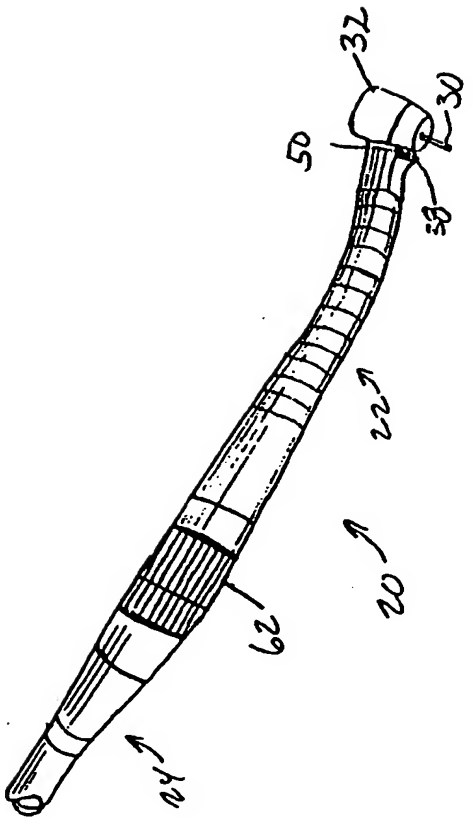
23. A dental device according to claim 21 and further including a second filter element comprising a relatively thin disc-shaped element extending transversely across said cartridge body and axially spaced from the first filter element.

24. A dental device according to claim 21 wherein said cartridge body comprises first and second coaxially aligned body portions closely axially spaced for mounting said filter element therebetween.

25. A dental device according to claim 15 wherein said cartridge body comprises a plurality of coaxially aligned, stacked body portions and wherein a plurality of filter elements are provided each intermediate respective ones of said cartridge body portions.

26. A dental device according to claim 15 wherein said cartridge body has smaller cross-sectional dimensions than mating end parts of said hand-held portion and said utility supply portion to permit a smooth merger of external surfaces thereof with said filter cartridge operatively interposed therebetween.

27. A filter for a dental device of the type including a hand-held working portion which utilizes air and water and a utility supply portion which supplies air and water to said hand-held working portion through respective air and water conduits therein; said filter comprising: a filter body defining an air opening therethrough and a water opening therethrough, said air and water openings being respectively positioned for alignment with corresponding air and water openings of at least one of a hand-held working portion and a utility supply portion; said filter body having filtering means for filtering air and water passing through the respective air and water openings thereof.


32
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62
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FIG. 1

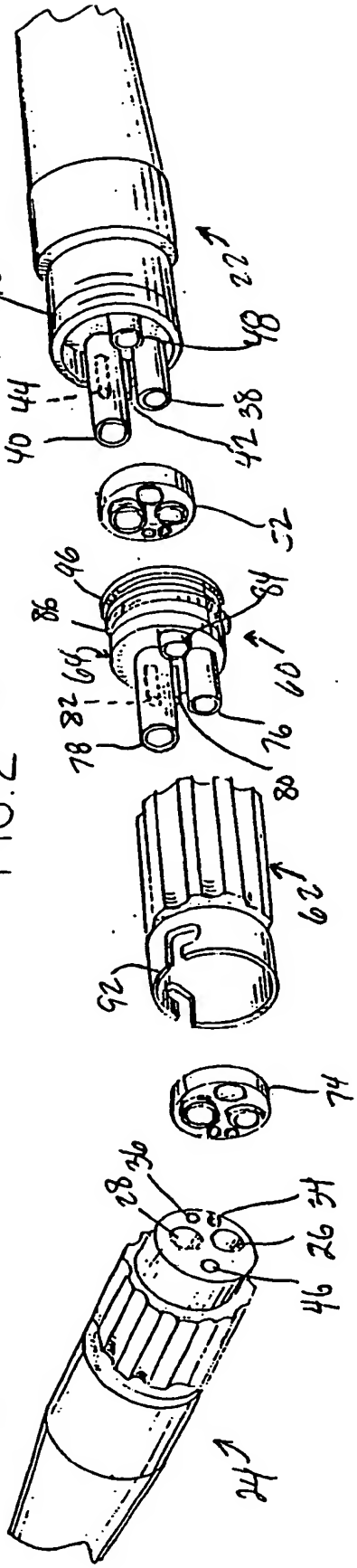
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FIG. 2

FIG. 3

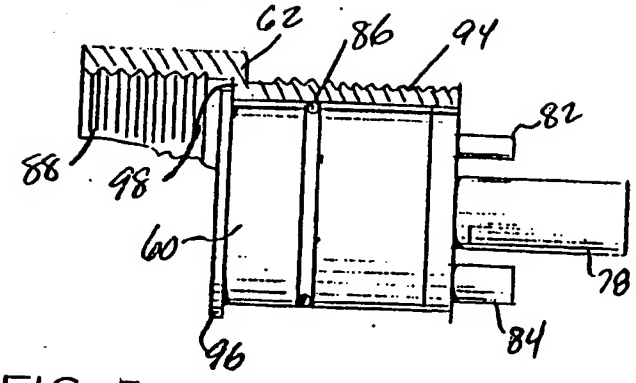


FIG. 4

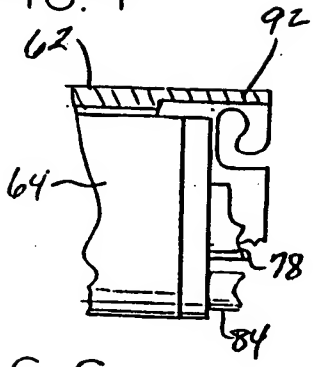


FIG. 5

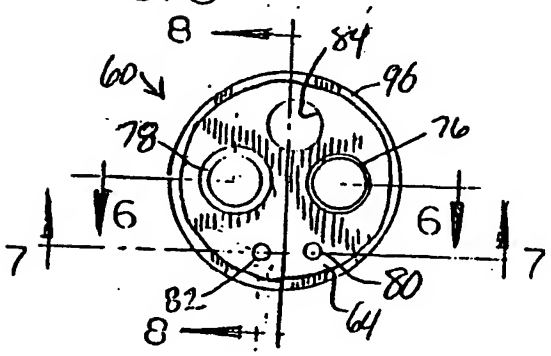


FIG. 6

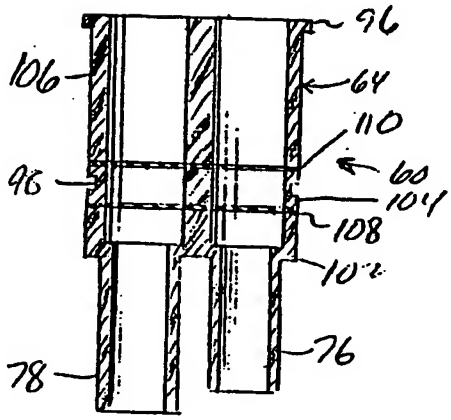


FIG. 7

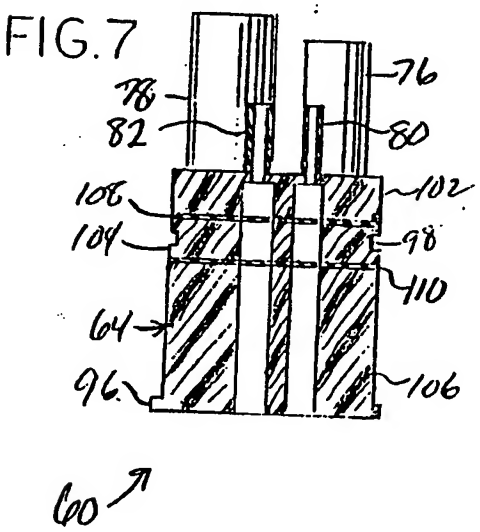
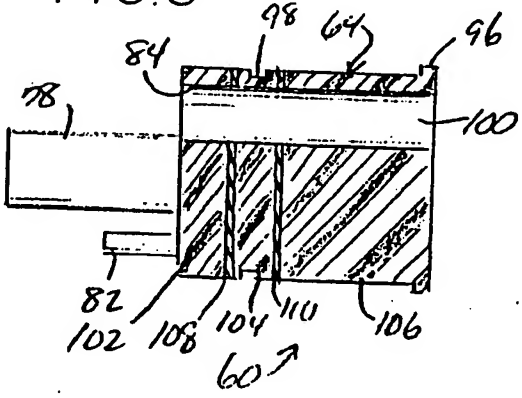


FIG. 8



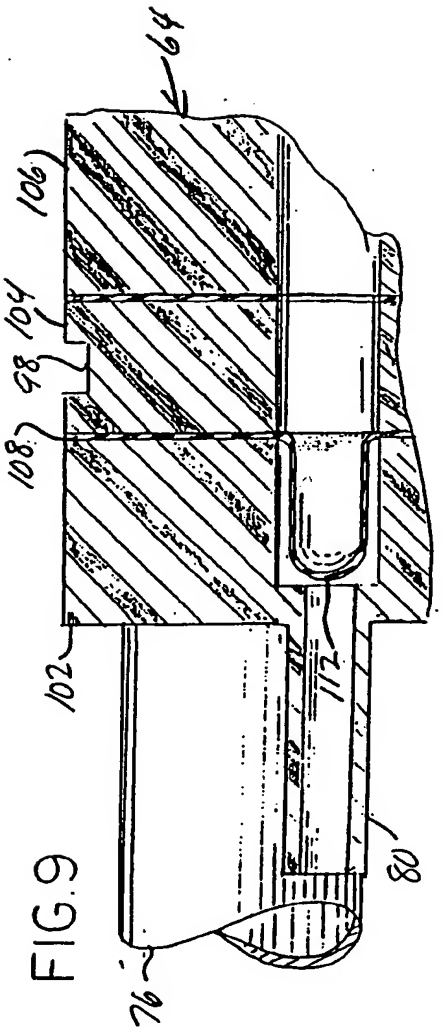


FIG.9

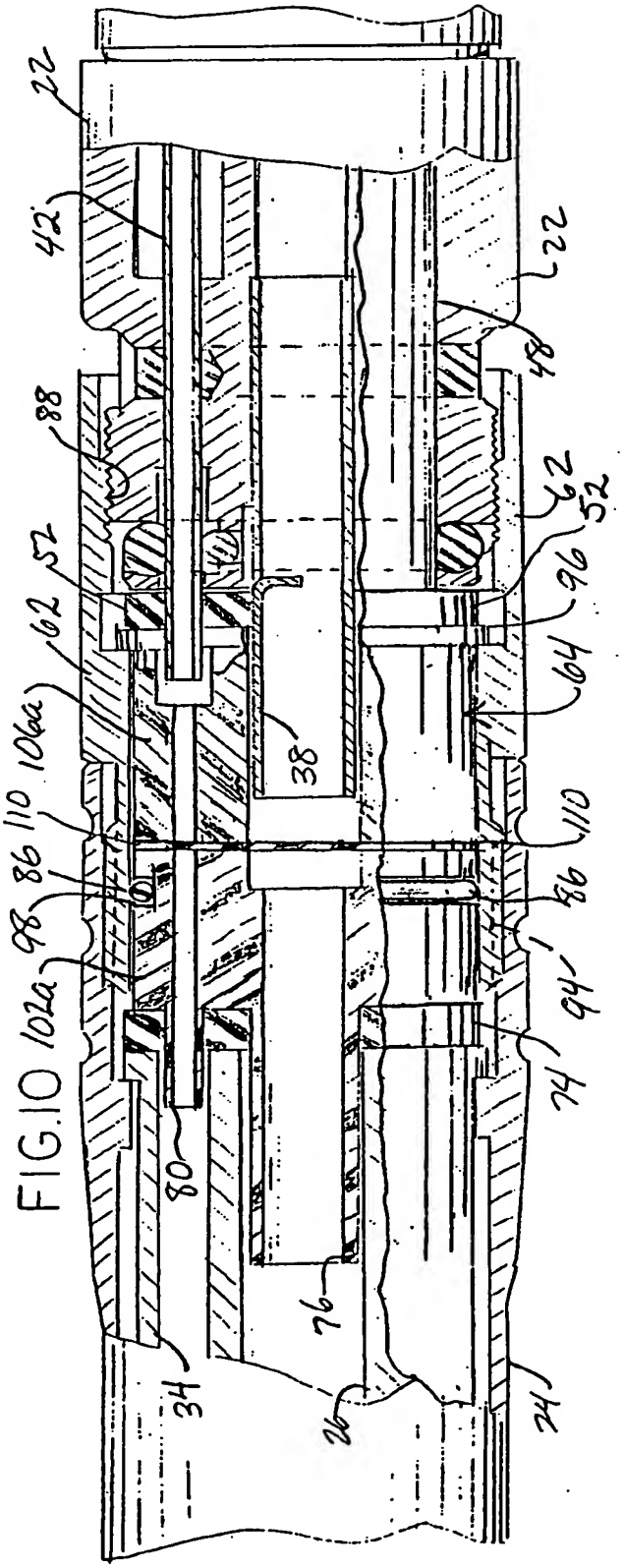


FIG.10

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(54) Disposable filter for dental handpiece.

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European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 12 0303

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US-A-4 741 697 (HERBISON) * column 3, line 33 - line 65 * * column 4, line 54 - column 10, line 22 *	1,15,27	A61C1/00 A61C1/18
A	US-A-5 211 558 (BAILEY ET AL.) * column 5, line 32 - line 42; figure 7 *	1,15,27	
A	US-A-5 230 624 (WOLF ET AL.) * the whole document *	1,15,27	
A	US-A-5 204 004 (JOHNSTON ET AL.) * the whole document *	1,15,27	
A,D	US-A-5 039 304 (HEIL)		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

A61C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	27 June 1995	Raybould, B

CATEGORY OF CITED DOCUMENTS

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O : non-written disclosure
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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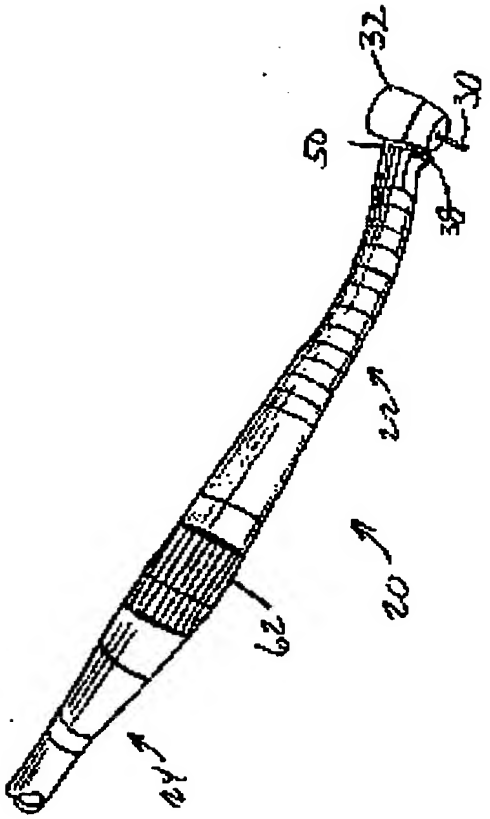
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FIG. 1

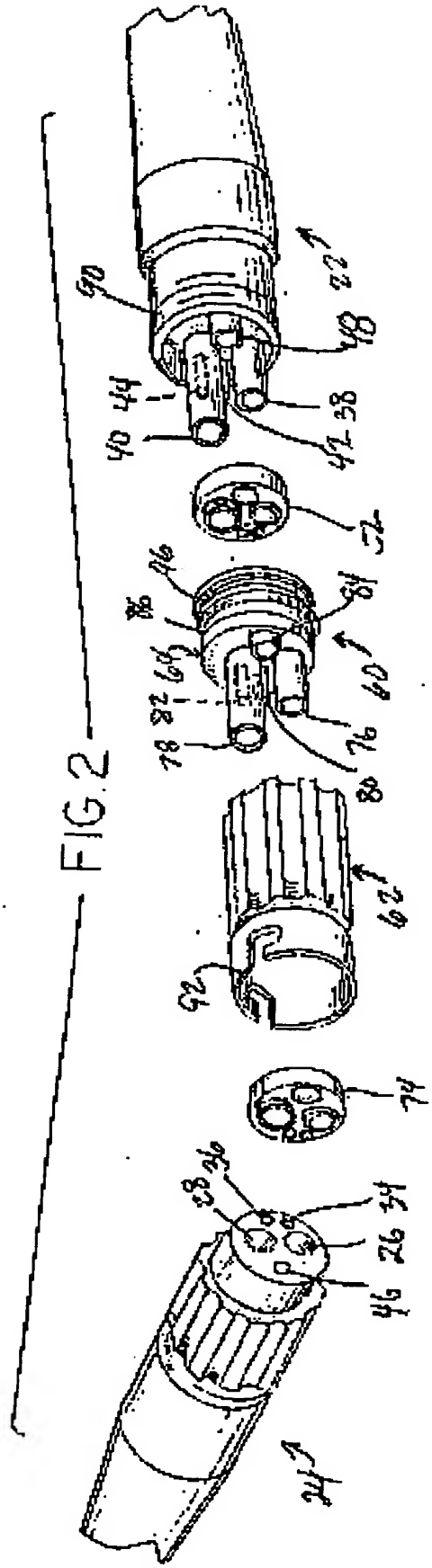
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FIG. 2

FIG.3

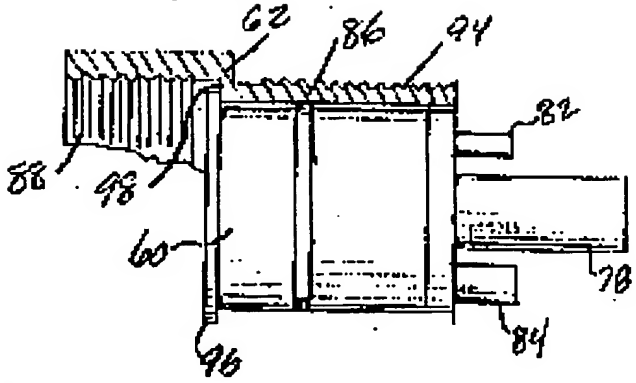


FIG.4

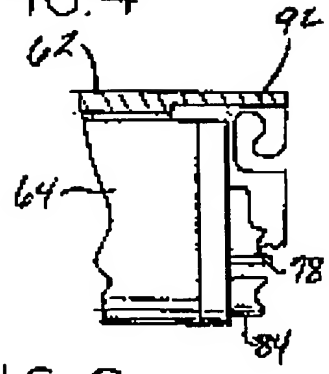


FIG.5

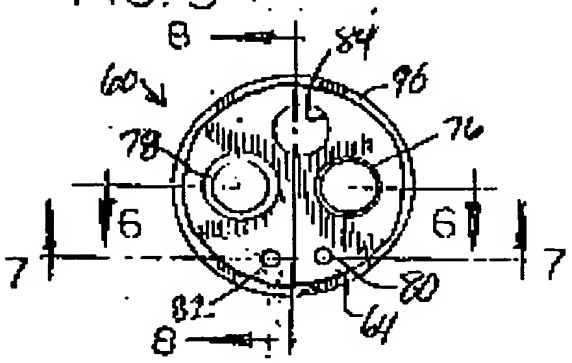


FIG.6

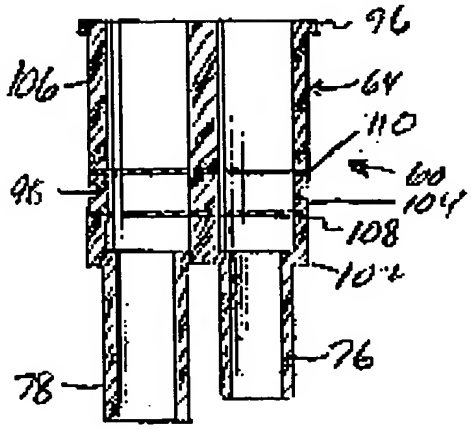


FIG.7

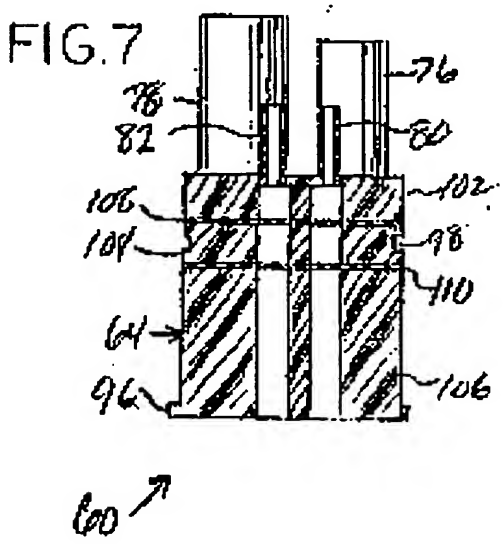
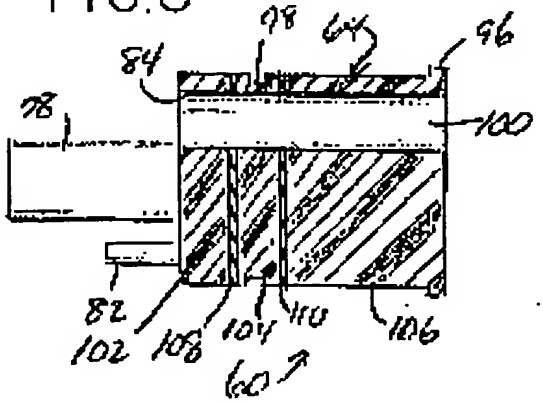


FIG.8



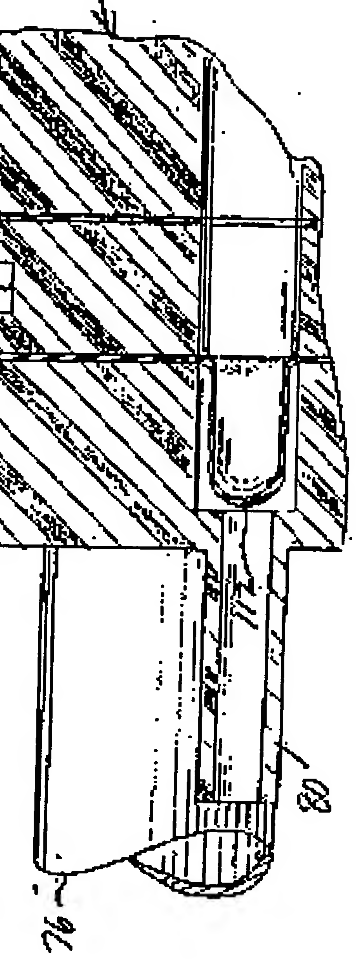

64
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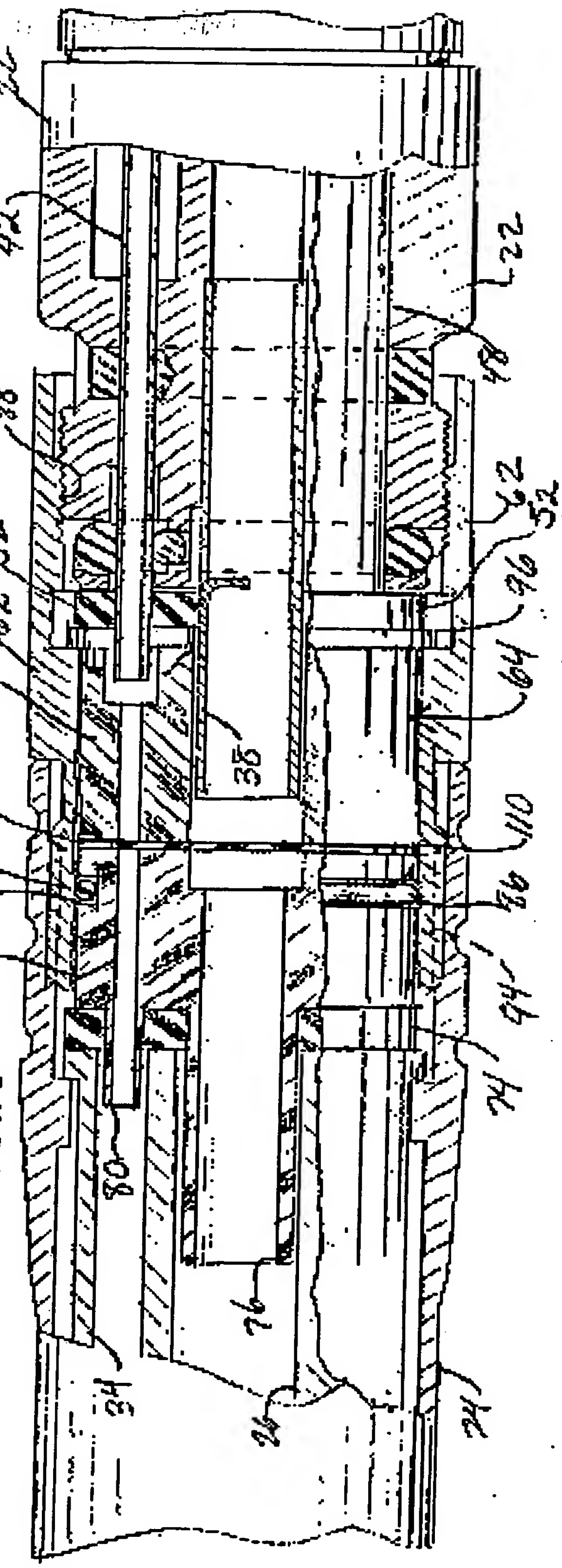
FIG.9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102a
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FIG.10

spaced for mounting said filter element therebetween.

25. A dental device according to claim 15 wherein said cartridge body (64) comprises a plurality of coaxially aligned, stacked body portions and wherein a plurality of filter elements are provided each intermediate respective ones of said cartridge body portions.

26. A dental device according to claim 15 wherein said cartridge body (64) has smaller cross-sectional dimensions than mating end parts of said handheld portion (22) and said utility supply portion (24) to permit a smooth merger of external surfaces thereof with said filter cartridge (60) operatively interposed therebetween.

Patentansprüche

1. Filter für eine dentale Vorrichtung der Art, die einen Hand-Arbeitsteil (22), der Luft und Wasser verwendet, und einen Betriebsmittelversorgungsteil (24) umfaßt, welcher Luft und Wasser zu dem Hand-Arbeitsteil (22) über jeweilige Luft- und Wasserkanäle darin zuführt; wobei der Filter eine Filterpatrone (60) umfaßt, in der mindestens ein Filterelement angebracht ist, und einen Patronenkörper (64) umfaßt, der eine Längsachse aufweist und eine der Länge nach durch den Patronenkörper (64) verlaufende Wasseröffnung definiert, dadurch gekennzeichnet, daß der Patronenkörper (64) ferner eine Luftöffnung definiert, die der Länge nach durch den Patronenkörper (64) verläuft, wobei die Luft- und Wasseröffnungen jeweils so angeordnet sind, daß sie auf die Enden der entsprechenden Luft- und Wasseröffnungen der Luft- und Wasserkanäle in gegenüberliegenden Enden eines Hand-Arbeitsteils (22) bzw. eines Betriebsmittelversorgungsteils (24) ausgerichtet sind; und daß mindestens ein Filterelement über den jeweiligen Luft- und Wasseröffnungen der Filterpatrone (60) zum Filtern von Luft bzw. Wasser, die hindurchströmen, zwischen einen Hand-Arbeitsteil (22) und einen Betriebsmittelversorgungsteil (24) einer dentalen Vorrichtung eingefügt ist; wobei die Filterpatrone (60) zum Befestigen von zwischenliegenden Luft- und Wasseranschlüssen eines Hand-Arbeitsteils (22) und eines Betriebsmittelversorgungsteils (24) einer dentalen Vorrichtung ausgelegt ist.

2. Filter nach Anspruch 1, welcher ferner eine Adaptervorrichtung (62) mit einem Adapterkörper, der zum Befestigen der Filterpatrone (60) darin ausgelegt ist, und eine Steckverbindungsvorrichtung zum Befestigen des langgestreckten Körpers zwischen in m Hand-Arbeitsteil (22) und einem Betriebsmittelversorgungsteil (24) einer dentalen Vorrichtung umfaßt.

3. Filter nach Anspruch 2, wobei die Steckverbindungsvorrichtung eine erste Steckverbindungsvorrichtung, die zum gemeinsamen Eingriff mit einem Gegenverbindungsstecker an einem Hand-Arbeitsteil (22) einer dentalen Vorrichtung angeordnet und ausgelegt ist, und eine zweite Steckverbindungsvorrichtung, die zum gemeinsamen Eingriff mit einem Gegenverbindungsstecker an einem Betriebsmittelversorgungsteil (24) einer d ntalen Vorrichtung angeordnet und ausgelegt ist, umfaßt.

4. Filter nach Anspruch 3, wobei die erste und die zweite Steckverbindungsvorrichtung Gewindeoberflächen umfassen, die an entgegengesetzten Enden des Körpers der Adaptervorrichtung (62) ausgebildet sind.

5. Filter nach Anspruch 1, wobei die Patrone (60) zum Einsetzen in einen Hohlraum ausgelegt ist, der dafür in einem Hand-Arbeitsteil (22) einer dentalen Vorrichtung an einem Ende davon, das mit einem Betriebsmittelversorgungsteil (24) verbindbar ist, vorgesehen ist.

6. Filter nach Anspruch 1, wobei der Patron nkörper (64) ferner eine langgestreckte Durchgangsöffnung zum Übertragen von Licht von einem Betriebsmittelversorgungsteil (24) zu einem Hand-Arbeitsteil (22) einer dentalen Vorrichtung umfaßt.

7. Filter nach Anspruch 6, welcher ferner ein optisches Übertragungselement umfaßt, das sich der Länge nach durch die langgestreckte Durchgangsöffnung des Patronenkörpers (64) erstreckt, zum Übertragen von Licht von einem Betriebsmittelversorgungsteil (24) durch die Filterpatrone (60) hindurch zu einem Hand-Arbeitsteil (22) einer dentalen Vorrichtung.

8. Filter nach Anspruch 6, welcher ferner eine Durchgangsöffnung in dem Filterelement zum Übertragen von Licht durch diese hindurch umfaßt.

9. Filter nach Anspruch 1, wobei das Filterelement ein relativ dünnes scheibenförmiges Element umfaßt, das sich quer über den Filterpatronenkörper (64) erstreckt.

10. Filter nach Anspruch 9, wobei das Filterelement einen im allgemeinen röhrenförmigen, stirnseitig geschlossenen Teil umfaßt, der sich zum Erhöhen der wirksamen Oberfläche des Filterelements in mindestens eine der Luft- und Wasseröffnungen in dem Filterpatronenkörper (64) erstreckt.

11. Filter nach Anspruch 9, welcher ferner ein zweites

Filterelement mit einem relativ dünnen scheibenförmigen Element umfaßt, das sich quer über den Patronenkörper (64) erstreckt und axial vom ersten Filterelement beabstandet ist.

12. Filter nach Anspruch 9, wobei der Patronenkörper (64) einen ersten und einen zweiten koaxial ausgerichteten Körperteil, die axial eng beabstandet sind, zum Befestigen des Filterelements dazwischen umfaßt.

13. Filter nach Anspruch 1, wobei der Patronenkörper (64) in den Querschnittsabmessungen kleiner ist als die passenden Endteile eines Handteils und eines Betriebsmittelversorgungsteils (24) einer dentalen Vorrichtung, um dadurch einen relativ glatten Zusammenschluß von deren äußeren Oberflächen mit der funktionsfähig dazwischen angeordneten Filterpatrone (60) zu ermöglichen.

14. Filter nach Anspruch 1, wobei der Patronenkörper (64) eine Vielzahl von koaxial ausgerichteten, gestapelten Körperteilen umfaßt und wobei eine Vielzahl von Filterelementen jeweils zwischen den betreffenden der Patronenkörperteile vorgesehen sind.

15. Dentale Vorrichtung, umfassend einen Hand-Arbeitsteil (22), der Luft und Wasser verwendet, und einen Betriebsmittelversorgungsteil (24), der Luft und Wasser zu dem Hand-Arbeitsteil (22) über jeweilige Luft- und Wasserkanäle darin zuführt; eine Filterpatrone (60), in der mindestens ein Filterelement angebracht ist und die einen Patronenkörper (64) umfaßt, der eine Längsachse aufweist und eine der Länge nach durch den Patronenkörper (64) verlaufende Wasseröffnung definiert, dadurch gekennzeichnet, daß der Patronenkörper (64) ferner eine Luftöffnung definiert, die der Länge nach durch den Patronenkörper (64) verläuft, wobei die Luft- bzw. Wasseröffnungen so angeordnet sind, daß sie auf die Enden von entsprechenden Luft- und Wasseröffnungen der Luft- und Wasserkanäle in gegenüberliegenden Enden des Hand-Arbeitsteils (22) bzw. des Betriebsmittelversorgungsteils (24) ausgerichtet sind; und daß mindestens ein Filterelement über den jeweiligen Luft- und Wasseröffnungen des Patronenkörpers (64) zum Filtern von Luft bzw. Wasser, die hindurchströmen, zwischen den Hand-Arbeitsteil (22) und den Betriebsmittelversorgungsteil (24) eingefügt ist; wobei die Filterpatrone (60) zum Befestigen von zwischenliegenden Luft- und Wasseranschlüssen des Hand-Arbeitsteils (22) und des Betriebsmittelversorgungsteils (24) ausgelegt ist.

16. Dentale Vorrichtung nach Anspruch 15, welche ferner eine Adaptervorrichtung (62) mit einem Adapterkörper, der zum Befestigen der Filterpatrone (60) darin ausgelegt ist, und eine Steckverbindungsvorrichtung zum Befestigen des langgestreckten Körpers zwischen dem Hand-Arb itsteil (22) und dem Betriebsmittelversorgungsteil (24) einer dentalen Vorrichtung umfaßt.

17. Dentale Vorrichtung nach Anspruch 15, wobei die Patrone (60) zum Einsetzen in einen Hohlraum ausgelegt ist, der dafür in dem Hand-Arbeitsteil (22) an einem Ende davon, das mit dem Betriebsmittelversorgungsteil (24) verbindbar ist, vorgesehen ist.

18. Dentale Vorrichtung nach Anspruch 15, wobei der Patronenkörper (64) ferner eine langgestreckte Durchgangsöffnung zum Übertragen von Licht von dem Betriebsmittelversorgungsteil (24) zu dem Hand-Arbeitsteil (22) umfaßt.

19. Dentale Vorrichtung nach Anspruch 15, welche ferner ein optisches Übertragungselement umfaßt, das sich der Länge nach durch die langgestreckte Durchgangsöffnung des Patronenkörpers (64) erstreckt, zum Übertragen von Licht von dem Betriebsmittelversorgungsteil (24) durch die Filterpatrone (60) hindurch zu dem Hand-Arbeitsteil (22).

20. Dentale Vorrichtung nach Anspruch 18, welche ferner eine Durchgangsöffnung in dem Filterelement umfaßt, die auf die Durchgangsöffnung in dem Patronenkörper (64) ausgerichtet ist.

21. Dentale Vorrichtung nach Anspruch 15, wobei das Filterelement ein relativ dünnes scheibenförmiges Element umfaßt, das sich quer über den Filterpatronenkörper (64) erstreckt.

22. Dentale Vorrichtung nach Anspruch 15, wobei das Filterelement einen im allgemeinen röhrenförmigen, stirnseitig geschlossenen Teil umfaßt, der sich zum Erhöhen der wirksamen Oberfläche des Filterelements in mindestens eine der Luft- und Wasseröffnungen in dem Filterpatronenkörper (64) erstreckt.

23. Dentale Vorrichtung nach Anspruch 21, welche ferner ein zweites Filterelement mit einem relativ dünnen scheibenförmigen Element umfaßt, das sich quer über den Patronenkörper (64) erstreckt und axial vom ersten Filterelement beabstandet ist.

24. Dentale Vorrichtung nach Anspruch 21, wobei der Patronenkörper (64) einen ersten und einen zweiten koaxial ausgerichteten Körperteil, die axial eng beabstandet sind, zum Befestigen des Filterelements dazwischen umfaßt.

25. Dentale Vorrichtung nach Anspruch 15, wobei der

Patronenkörper (64) eine Vielzahl von koaxial ausgerichteten, gestapelten Körperteilen umfaßt und wobei eine Vielzahl von Filterelementen jeweils zwischen den betreffenden der Patronenkörperteile vorgesehen sind.

26. Dentale Vorrichtung nach Anspruch 15, wobei der Patronenkörper (64) kleinere Querschnittsabmessungen aufweist als die passenden Endteile des Handteils (22) und des Betriebsmittelversorgungsteils (24), um einen glatten Zusammenschluß von deren äußeren Oberflächen mit der funktionsfähig dazwischen angeordneten Filterpatrone (60) zu ermöglichen.

Revendications

1. Filtre pour instrument dentaire du type comprenant une partie de travail tenue à la main (22) qui utilise de l'air et de l'eau et une partie de source d'alimentation (24) qui alimente en air et en eau ladite partie de travail tenue à la main (22) via des conduits d'air et d'eau respectifs en son sein ; ledit filtre comprenant une cartouche de filtre (60) dans laquelle au moins un élément de filtre est monté et comprenant un corps de cartouche (64) ayant un axe longitudinal et définissant une ouverture d'eau s'étendant longitudinalement à travers ledit corps de cartouche (64), caractérisé en ce que le corps de cartouche (64) définit également une ouverture d'air s'étendant longitudinalement à travers ledit corps de cartouche (64), de manière que lesdites ouvertures d'air et d'eau soient respectivement positionnées pour un alignement avec des extrémités d'ouvertures d'air et d'eau correspondantes de conduits d'air et d'eau dans des extrémités se faisant face d'une partie de travail tenue à la main (22) et d'une partie de source d'alimentation (24), respectivement ; et en ce qu'au moins un élément de filtre est intercalé en travers des ouvertures d'air et d'eau respectives de la cartouche de filtre (60) pour filtrer respectivement l'air et l'eau passant à travers entre une partie de travail tenue à la main (22) et une partie de source d'alimentation (24) d'un instrument dentaire ; ladite cartouche de filtre (60) étant configurée pour un montage entre des connexions d'air et d'eau d'une partie de travail tenue à la main (22) et d'une partie de source d'alimentation (24) d'un instrument dentaire.

2. Filtre selon la revendication 1 et comprenant également un moyen d'adaptateur (62) comportant un corps d'adaptateur configuré pour un montage de ladite cartouche de filtre (60) en son sein et un moyen de raccord pour monter ledit corps allongé entre une partie de travail tenue à la main (22) et une partie de source d'alimentation (24) d'un instrument dentaire.

3. Filtre selon la revendication 2, dans lequel ledit moyen de raccord comprend un premier moyen de raccord positionné et configuré pour un emboîtement mutuel de coopérati n avec un raccord correspondant sur une partie de travail tenue à la main (22) d'un instrument dentaire et un second moyen de raccord positionné et configuré pour un emboîtement mutuel de coopération avec un raccord correspondant sur une partie de source d'alimentation (24) d'un instrument dentaire.

4. Filtre selon la revendication 3, dans lequel lesdits premier et second moyens de raccords comprennent des surfaces filetées formées aux extrémités opposées du corps dudit moyen d'adaptateur (62).

5. Filtre selon la revendication 1, dans lequel ladite cartouche (60) est configurée pour un emboîtement mutuel au sein d'une cavité prévue pour elle dans une partie de travail tenue à la main (22) d'un instrument dentaire à une extrémité qui peut être reliée à une partie de source d'alimentation (24).

6. Filtre selon la revendication 1, dans lequ l ledit corps de cartouche (64) comprend également une ouverture traversante allongée pour transmettre de la lumière d'une partie de source d'alimentation (24) à une partie de travail tenue à la main (22) d'un instrument dentaire.

7. Filtre selon la revendication 6 et comprenant également un élément de transmission optique s'étendant longitudinalement à travers ladite ouverture traversante allongée dudit corps de cartouche (64) pour transmettre de la lumière d'une partie de source d'alimentation (24) à une partie de travail tenue à la main (22) d'un instrument dentaire à travers ladite cartouche de filtre (60).

8. Filtre selon la revendication 6 et comprenant également une ouverture traversante dans ledit élément de filtre pour transmettre de la lumière au travers.

9. Filtre selon la revendication 1, dans lequel ledit élément de filtre comprend un élément en forme de disque relativement mince s'étendant transversalement en travers dudit corps de cartouche de filtre (64).

10. Filtre selon la revendication 9, dans lequel ledit élément de filtre comprend une partie à extrémité fermée, généralement tubulaire, s'étendant dans au moins l'une desdites ouvertures d'air et d'eau dans ledit corps de cartouche de filtre (64) pour accroître la surface effective dudit élément de filtre.

11. Filtre selon la revendication 9 et comprenant égal - ment un second élément de filtre comprenant un